

California

Certification by the California Air Resources Board

General Information

In California, CARB is responsible for the emissions certification on all motor vehicles. The California Health and Safety Code authorizes CARB to establish emissions certification procedures and to certify fuel systems that have met its requirements. Further, the California Vehicle Code prohibits the installation, sale, offering for sale, or advertisement of any motor vehicle pollution control device or system that alters or modifies the original design or emissions performance without CARB's approval.

California's certification process for aftermarket conversions is similar to the EPA's, but there are some significant differences. In some ways, it is more stringent than the EPA's; in other ways, it is not. Some of the major differences are:

- CARB certification applies to the model year in which the vehicle was originally produced, instead of the year or model year in which the vehicle is converted
- CARB does not impose a time limit on the terms of the certification

Who to Contact

California Environmental Protection Agency
Air Resources Board
Mobile Source Operations Division
Aftermarket Parts Section
9528 Telstar Avenue
P.O. Box 8001
El Monte, CA 91731
Telephone: (818) 575-6800
Fax: (818) 575-6685



Table 10

California Certification Procedures for Aftermarket Conversions

Model Year of Vehicle or Engine	Title of Certification Procedure
All Model Years	California Certification and Installation Procedure for Alternative Fuel Retrofit Systems for Motor Vehicles Certified for 1994 and Subsequent Model Years and for All Model Year Motor Vehicle Retrofit Systems Certified for Emission Reduction Credit

- Medium- and heavy-duty vehicles can be certified in California using emissions test results obtained on a chassis dynamometer (instead of an engine dynamometer)
- CARB's requirements for durability testing are considerably different than the EPA's.

Regulations

The procedures for certifying CNG or LPG aftermarket vehicle conversions in California are contained in *California Code of Regulations*, Title 13, Section 2030. Various procedures have been in effect since 1975. See Table 10 for the title of the current certification procedure.

Prior to the release on September 4, 1997, of the EPA addendum to Memorandum 1A (see page 7), California used the procedure entitled "California Exhaust Emission Standards and Test Procedures for Systems Designed to Convert Motor Vehicles Certified for 1993 and Earlier Model Years to Use Liquefied Petroleum Gas or Natural Gas Fuels" for 1993 and older vehicles. However, the EPA no longer accepts that procedure as a reasonable basis to believe that emissions performance has not been adversely affected.

What Does Certification Apply To?

The certification procedure identified in Table 10 applies to vehicles that have already been registered with the California Department of Motor Vehicles. Other procedures must be followed for new vehicles that have not yet been registered.

The procedure applies to dedicated, dual-fuel, and bi-fuel aftermarket conversions for light-duty vehicles and trucks, medium-duty vehicles, and heavy-duty engines/vehicles. CARB's definition of dual-fuel is the same as the EPA's (see page 2 or the glossary). CARB defines "bi-fuel" as any vehicle or engine with two separate fuel systems. Bi-fuel vehicles or engines can run on either the conventional fuel or on the conventional fuel and the alternative fuel simultaneously. An example of this type of vehicle/engine is a heavy-duty engine converted to run on diesel and CNG (or LPG) with a pilot-ignition system. In pilot-ignition systems, a small amount of diesel fuel starts and maintains combustion and CNG is added once power is required.

An alternative test method is available for certifying medium- and heavy-duty engines in vehicles without removing the engine from the vehicle (see the section on emissions testing on page 31). If the alternative method is used, the vehicle does not qualify for mobile source emission reduction credits (MSERCs; see page 35 for a discussion).

Each certification applies to a specific engine family, and the manufacturer may only convert vehicles from the engine family specified (see the sidebar on page 9 for an explanation of engine families). CARB uses the engine family names defined by the EPA, but does not change the engine family name after the vehicle has been converted.

At the end of a successful certification process, CARB will issue an Executive Order (EO) that authorizes the applicant to proceed with vehicle conversions. The EO permits the manufacturer and installers to convert vehicles of the engine family specified in the EO. The EO does not include a date restriction beyond which vehicles can no longer be converted—it remains in effect for as long as the applicant wishes to convert vehicles of the particular model year in question.

Introduction to the Certification Process

The flow chart in Figure 4 illustrates the steps necessary to obtain emissions certification in California, using full durability testing. All steps must be completed before an EO can be issued. Alternative methods can be used for durability testing to determine DFs (see Appendices F through I for illustrations). DFs are explained on page 20 of this guide.

California's certification process includes the development and acceptance of both a certification plan and an application. CARB generally requires one to two weeks to review and approve the certification plan. Approving the certification application and issuing the EO takes about two months. If the manufacturer fails to supply all the required information, more time may be needed.

Certification Plan, Application, and Fees

As the first step in the certification process, the manufacturer must develop a certification plan for all the engine families that it intends to certify during the year. The plan must include the emissions standards applicable to each engine family, as well as information about the development of durability data, the format to

be followed during durability testing, and the name of the laboratory that will conduct the emissions testing. The manufacturer should provide all relevant details on the conversion equipment, including the operating characteristics, a parts list, and installation instructions or manual. The plan should be as comprehensive as possible. Before any testing can begin, the plan must be submitted to CARB for review and approval.

Once CARB approves the certification plan, testing may begin. The testing must be accomplished according to the procedures that CARB approved in the certification plan. When testing is complete, the manufacturer may submit an application for certification, submitting a separate application for each engine family. Although CARB does not have a set format for the certification application, it does have a list of items that must be included. For more information, contact CARB at the address given on page 27.

California does not charge a fee for certifying aftermarket vehicle conversions.

Emissions Standards

The emissions standards that apply to the certification of aftermarket conversions in California are those that were in effect for the model year of the vehicle being certified. For example, if a manufacturer wishes to certify a 1996 model year vehicle from a particular engine family, the applicable emissions standards are those that were in effect for the 1996 model year. There are some exceptions for medium- and heavy-duty vehicles. Refer to Section 5 of "California Certification and Installation Procedures for Alternative Fuel Retrofit Systems for Motor Vehicles Certified for 1994 and Subsequent Model Years and for All Model Year Motor Vehicle Retrofit Systems Certified for Emission Reduction Credit."

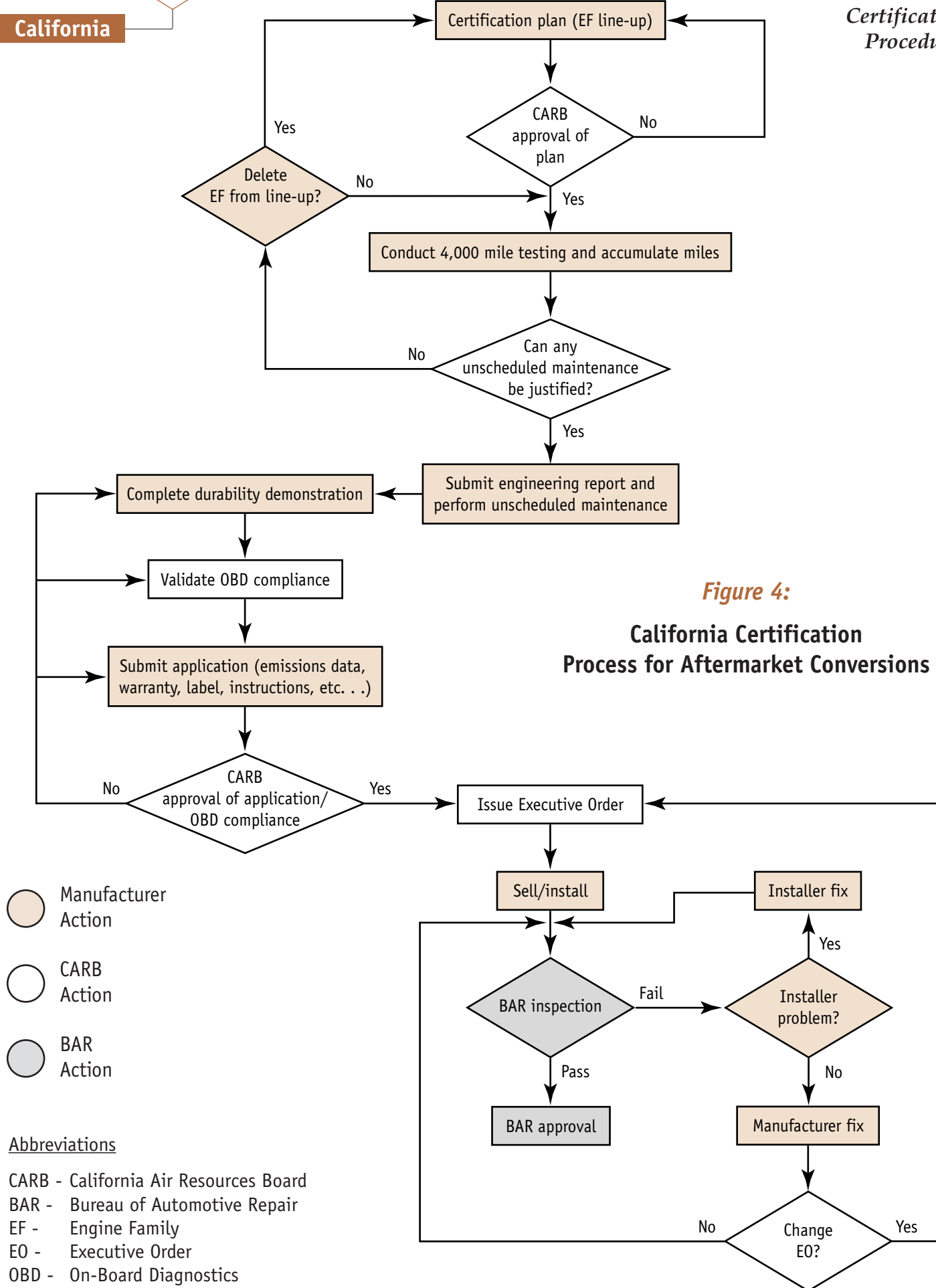


Table 11

Index to California Exhaust, Evaporative, and Refueling Emissions Standards		
Emissions Type	Vehicle Type	Name
Exhaust	Passenger Car, Light-Duty Truck, Medium-Duty Vehicle	California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles
Exhaust	Heavy-Duty Engine, Heavy-Duty Vehicle (Otto-Cycle)	California Exhaust Emission Standards and Test Procedures for 1987 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles
Exhaust	Heavy-Duty Engine, Heavy-Duty Vehicle (Diesel-Cycle)	California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles
Evaporative	Passenger Car, Light-Duty Truck, Medium-Duty Vehicle, Heavy-Duty Vehicle	California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles
Refueling	Passenger Car, Light-Duty Truck, Medium-Duty Vehicle with GVWR ^a less than or equal to 8,500 lb	California Refueling Emission Standards and Test Procedures for 1998 and Subsequent Model Motor Vehicles

Table 11 identifies the different California standards that apply to exhaust, evaporative, and refueling emissions. A conversion kit can only be certified to the same or more stringent standard as the one to which the vehicle/engine was originally certified. For instance, if the vehicle was originally certified to LEV emissions standards, the conversion can be certified to LEV or the more stringent ULEV standards, but not to the less stringent TLEV standards. Measured emissions must remain within the applicable standards for the useful life of the vehicle (see Appendix A for a definition of useful life). In the case of dual-fuel vehicles, both fuels must meet the standards. For “credit-generating vehicles” (vehicles that earn MSERCs; see the discussion on page 35), the certification standards applicable to both fuels under dual-fuel operation must not be more than one tier (see the sidebar on page 17) apart. Examples of standards that are one tier apart are TLEV for gasoline and LEV for

propane, or LEV on gasoline and ULEV on CNG. See Appendix D for a summary of exhaust emissions standards.

^a Gross Vehicle Weight Rating

Emissions Testing

For aftermarket conversions, vehicles are divided into the following three categories to determine the emissions testing method:

Category I — light-duty passenger cars, trucks, and medium-duty vehicles originally certified on a chassis dynamometer

Category II — vehicles weighing 14,000 pounds GVWR or less that were not originally certified on a chassis dynamometer

Category III — vehicles weighing more than 14,000 pounds GVWR.

The documents referenced in Tables 10 and 11 contain the processes for conducting the emissions testing. Passenger cars and light-duty trucks are tested using the

Table 12

Test Procedures Required in California for Vehicle Categories

Vehicle Category	Test Procedure Required to Generate MSERCs ^a	Other Acceptable Test Procedures ^b
I	FTP 75	none
II	Heavy-Duty Transient	FTP Chassis Dynamometer Cycle
III	Heavy-Duty Transient	Chassis Dynamometer Cycle

^a Mobile Source
Emission Reduction
Credits

^b Will not generate
Mobile Source
Emission Reduction
Credits

FTP 75 driving schedule (see Figure 2 on page 18). This same procedure can be used for vehicles in Category II and a suitable chassis dynamometer test for Category III, but they would not qualify for MSERCs. To qualify for MSERCs, Category II and III vehicles must be tested using heavy-duty transient procedures on an engine dynamometer. Table 12 summarizes the testing procedures that can be used for each vehicle category.

Like the EPA, CARB does not approve or recommend testing laboratories or facilities, although it does maintain a list of laboratories with which it has worked. If your company plans to use a facility that is not on CARB's list, provide detailed information about that laboratory and its qualifications as part of the certification plan. A number of new tests, such as enhanced evaporative testing and the cold CO procedure, require specialized equipment and facilities.

Following the installation of conversion systems, vehicles must be driven 4,000 ± 100 miles to stabilize emission rates before exhaust and evaporative emissions testing can be conducted.

CARB requires that certification-grade fuel be used for emissions testing of CNG and LPG conversions. Commercial-grade fuel is acceptable for use during mileage accumulation for durability testing. Certification and commercial grades of fuel are compared in Appendix E.

Dedicated CNG vehicles are exempt from evaporative emissions testing. Dual-fuel CNG vehicles, on the other hand, must comply with the applicable evaporative emissions standard when operating on gasoline. LPG vehicles must undergo evaporative emissions testing. The applicable standards and procedures are provided in "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles." If the vehicle is dual-fuel, both fuels must be tested. In lieu of actual testing, manufacturers may provide an engineering analysis of the impact of their systems on evaporative emissions. This analysis must demonstrate that the aftermarket fuel system or any other modification to the vehicle does not result in moving, removing, or recalibrating the OEM's gasoline evaporative control system.

If the vehicle and its engine family were originally certified to the new California enhanced evaporative emissions standards, the converted vehicle must also comply with these standards. These new standards are more involved than the previous evaporative standards and require both a three-day and a two-day diurnal test plus a running loss test.

One test vehicle is required for each engine family to be certified. If the CARB-approved certification plan permits the use of derived DFs, only one test is required per vehicle per fuel after accumulating 4,000 miles following conversion. This emissions test establishes a baseline on which to apply the DFs. The test vehicle is known as the EDV.

If the CARB-approved certification plan requires the manufacturer to establish DFs, durability testing will be required. Durability data must be obtained on only one vehicle from each engine family to be certified. This vehicle is referred to as the DDV. Provisions that allow “carry-across” (see page 22) of previously established DFs are explained in the next section. The minimum number of tests to be conducted on the DDV depends on whether or not it must comply with intermediate useful life standards (see Appendix A for a definition of useful life). If the vehicle must comply with intermediate useful life standards, it must be tested three times per fuel—once at its baseline mileage level (4,000 miles after conversion), once after it accumulates its intermediate useful life mileage, and once after it accumulates its full useful life mileage. If the vehicle is not required to comply with intermediate useful life standards, only two tests are required—one at the baseline mileage and one at the full useful life mileage.

Many manufacturers conduct more frequent tests on their DDVs to discover whether they have any early emissions problems, and to ensure more reliable trends with which to establish DFs. Under some of the certification procedures, the test vehicle and the DDV can be one and the same (see the discussion below about durability testing).

Options for Durability Testing, and Carry-Across and Carry-Over Provisions

Several alternative procedures for demonstrating the full useful life durability of emissions for each engine family are available. For example, under certain circumstances, it may be possible to apply a gasoline DF to the alternative fuel emissions results (gasoline DFs for various OEM vehicles are available from CARB). The process is outlined in CARB’s Manufacturers Advisory Correspondence #95-05. The flow chart in Appendix F

illustrates the complete certification process when it entails a request for, and use of, gasoline DFs.

Remember that with this substitute procedure, a full in-use durability test on the alternative fuel is still required. First, the manufacturer must test and record data for emissions, catalytic converter temperatures, and air/fuel ratio calibrations on gasoline and the alternative fuel at 4,000 miles. Next, the same tests must be repeated for the alternative fuel at the intermediate and full useful life mileages. After the manufacturer has completed the testing, CARB will evaluate the alternative fuel calibration control capability and the thermal degradation of the catalyst, and make the appropriate comparisons. If the same conversion equipment is to be used on a wide array of vehicles, the durability test should be conducted using a “worst-case” vehicle. Usually, this vehicle will have the most advanced fuel metering technology, and will be certified to the most stringent emissions standard.

CARB’s Manufacturers Advisory Correspondence #95-05 outlines another method to demonstrate useful life durability. This particular method uses carry-across provisions. It also requires a full in-use demonstration of durability. Appendix G contains a flow chart illustrating the steps necessary under this procedure.

CARB has also implemented a program that allows manufacturers to apply derived DFs to the emissions test results from passenger cars, light-duty trucks, and medium-duty vehicles. These DFs must be confirmed through durability testing, but the testing can be accomplished over a two-year period. Under this scenario, an EO would be issued based on the use of derived DFs, with subsequent review after full durability testing is complete. With this approach, manufacturers may convert vehicles before the full durability testing is completed. Manufacturers

assume liability for a recall if the durability data do not confirm the derived DFs. The process is outlined in CARB's Manufacturers Advisory Correspondence #95-10, and the necessary steps are illustrated in Appendix H of this guide.

A similar program is available for heavy-duty engines using derived DFs. The program is outlined in CARB's Manufacturers Advisory Correspondence #95-07, and Appendix I illustrates the necessary steps.

On-Board Diagnostics (OBD) Requirements

An introduction to OBD is provided on page 22. California adopted its OBD II regulations in 1989, and implementation began in 1994. According to these regulations, aftermarket conversion of vehicles must not result in the disabling of the OBD systems—these systems must remain fully functional. Applications for waivers of this requirement for CNG and LPG vehicles may be approved if the manufacturer can provide a significant engineering analysis to justify foregoing the specific monitoring requirements. Currently, applications for waivers will be available for conversion of vehicles through the end of model year 2004. CNG and LPG vehicles must still comply with the less stringent OBD I regulations.

General Emissions Warranty Coverage

California's procedure for aftermarket conversions requires both the manufacturer and the installer to provide a warranty on emissions-related components. The warranty must cover all parts and labor, including those associated with problem diagnosis. Two levels of warranty coverage must be offered: (1) three years or 50,000 miles, whichever comes first, for all components; and (2) seven years or

70,000 miles, whichever comes first, for high-priced components. The value of high-priced components includes the price of the component and the labor for diagnosis and repair. CARB establishes a value of the high-priced components annually and disseminates this information through a Manufacturers Advisory Correspondence. For the 1998 model year, the value for high-priced components is \$400. The warranty periods begin on the date of conversion, and the vehicle mileage at that time is considered to be zero.

Owner's Manual, Maintenance Schedule, and Vehicle Labels

The manufacturer or installer must provide the customer with an owner's manual that includes details about the conversion system, refueling procedures, maintenance, warranty, and servicing locations.

CARB requires that a label providing certain information to the consumer be affixed under the hood of each converted vehicle. This label must be situated beside or close to the OEM emissions control label, and it must include information about the manufacturer and installer of the conversion equipment, emissions certification information, details of the installation procedure, alterations made to the original vehicle, and a vacuum hose routing diagram.

Record Keeping

Installers are required to retain certain information, listed below, in their files about each converted vehicle:

- Vehicle identification number (VIN)
- California license plate number
- Vehicle owner, address, and phone number
- Installation date
- EO number.

Installers must also supply the same information to the manufacturer, who in turn is required by regulation to retain it. All information must be kept for six years after the date of conversion.

Audit, In-Use Surveillance, and Liabilities

In addition to other kinds of testing, CARB may require manufacturers to conduct in-use enforcement emissions testing. The enforcement testing may be the result of a number of different circumstances, including poor emissions performance reported by CARB's field organization. If required, such testing must be conducted on a minimum of ten vehicles per certified kit/engine family. If the results are unsatisfactory, CARB may request that the manufacturer initiate a recall. Section 8 ("In-Use Enforcement Test Requirements") of the certification procedure contains additional details.

Responsibilities of the Installer

The installer must provide a warranty statement, preapproved by CARB, to the owner of each converted vehicle. The purpose of the warranty is to guarantee that the conversion system has been installed according to the manufacturer's installation instructions or manual and its EO. The minimum coverage period is for three years or 50,000 miles, whichever comes first, and it applies to both parts and labor.

Installers are required to fill out a portion of the under-hood emissions control label prior to its application. They are also required to retain certain conversion-related information (see the discussion of record keeping on page 34 of this guide).

After each conversion is completed, the installer must transport the vehicle to a Bureau of Automotive Repair (BAR) Referee Smog Check Station for inspection and testing. It may be helpful to bring a copy of the EO to BAR for reference. CARB has an alternative inspection procedure to permit one out of ten vehicles to be inspected at the BAR station. The installer must obtain prior approval from CARB to use this alternative. If the vehicle passes the BAR inspection, it is issued a decal (different from the under-hood label), which is generally installed on the door jamb.

Penalties and Liabilities

Manufacturers that do not comply with either the California Health and Safety Code or the California Vehicle Code are subject to fines and vehicle recalls. Although manufacturers that have received EOs are exempt from the tampering provisions of the California Vehicle Code, they are still subject to recalls if vehicles fail subsequent emissions tests.

Mobile Source Emission Reduction Credits

A number of California's air quality districts have instituted programs for MSERCs. These credits apply to any vehicle or engine that is converted to meet a more stringent emissions standard (for example TLEV to LEV) than the one to which the vehicle was originally certified.